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# Loot Boxes

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"Loot boxes" are video game mechanics that provide randomized rewards. "Paid loot boxes" that require purchase using real-world money by players are frequently implemented by companies to "monetize" and generate revenue. The technical definition of "loot boxes" is wider than that of when the term is used in common parlance, which generally only refers to "paid loot boxes." Previous research has identified conceptual and psychological similarities between paid loot boxes and gambling. Regulation and other harm-minimization measures have been suggested and adopted in certain countries. Further research is required to understand the nature and the extent of any potential harms.

## Popular Usage

"Loot boxes" are video game mechanics that provide randomized rewards to players (Drummond & Sauer, 2018). In contrast to the technical definition of a loot box (which is addressed below under Section 2), when used in colloquial discussions between players, in popular media writing, in regulatory policy documents and in the academic literature, "loot boxes" generally refers exclusively to loot boxes that require purchase using real-world money by players, *i.e.*, so-called "paid loot boxes" (Xiao et al., 2021d), "randomized monetization methods" (Xiao, 2021a) or "Embedded-Embedded" and "Embedded-Isolated" "Random Reward Mechanisms" (Nielsen & Grabarczyk, 2019). Such paid loot boxes are implemented by video game companies to monetize the game and generate revenue from players (Karlsen, 2021): certain games (which might be free for the player to download and play) rely on loot boxes as an exclusive source of income, whilst others rely on them as an additional source of income that complements the sale of the software and other forms of [monetization](#), such as "season passes" or "battle passes" (see Joseph, 2021) and ad revenue (Xiao, 2021b). Usually, different potential rewards will have varying probabilities of being "won," and players often seek to purchase multiple loot boxes in order to obtain rarer rewards (Nicklin et al., 2021). Such monetization systems are similar to, and were likely inspired by (Nielsen & Grabarczyk, 2019), how *physical* collectible or trading card games (such as *Magic: The Gathering* (Wizards of the Coast, 1993)) monetize by selling sealed, blind "booster packs" containing randomized cards that players have to purchase repeatedly because most competitively strong and monetarily valuable cards often have the lowest probabilities of being obtained (Švelch, 2020; Zendle et al., 2021).

Mainstream discourse on the potential harms of paid loot boxes, their similarities with gambling and their potential illegality under existing law arguably flowed from the controversy surrounding the implementation of paid loot boxes in *Star Wars Battlefront II* (DICE, 2017), which itself was by far not the first instance of paid loot box implementation but a culmination of many popular games deciding to implement paid loot boxes (see GameSpot Staff, 2017; Jackson, 2017): amongst other debates, players questioned whether it is appropriate for a full-priced console game, already sold as a product, to additionally monetize using loot boxes, and whether it is appropriate for games to be designed such that players must purchase loot boxes in order to access certain content and be competitive when playing against other players ("pay-to-win"; see Neely, 2019). In some games, players who paid for, or paid *more* for, loot boxes can become stronger than other players, which could potentially encourage those other players to also buy loot boxes so that they can catch up and compete on a

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more equal footing. Accordingly, there may be a stronger incentive to buy loot boxes that give a competitive advantage than those that only provide cosmetic items that do not otherwise affect gameplay (Zendle et al., 2019a).

Notably, these randomized mechanics are not necessarily graphically represented as, or titled as, "loot boxes" by video game companies and may instead appear visually in other forms (Xiao, 2021a), such as treasure chests (e.g., in *Clash Royale* (Supercell, 2016)), packs of cards (e.g., in *Hearthstone* (Blizzard Entertainment, 2014)), prize wheels (e.g., in *灌篮高手 [SLAM DUNK]* (蛙扑网络技术 [Shanghai Wapu Network Technology], 2019)), Gachapon dispensing machines (e.g., in *Yoshi's Crafted World* (Good-Feel, 2019)), summoning systems that might be referred to as "gacha" systems (see Woods, 2022; e.g., in *Genshin Impact* (miHoYo, 2020)), or even casino games (e.g., in *Golden HoYeah- Casino Slots* (International Games System, 2015; see Xiao & Newall, 2021)). Besides visual appearance, loot boxes in various games could be designed very differently in terms of, *inter alia*, their randomization process, and their content. Only some loot boxes try to reduce the occurrence of extremely "bad luck" by implementing "pity" mechanics that increase the player's probabilities of obtaining rarer rewards as the player buys more loot boxes up until that player obtains a rarer reward, at which point the probabilities are reset to their default values and the process repeats (Xiao et al., 2021d): this ensures that players would be guaranteed to receive a rarer reward after spending a predetermined amount of money. Another example is that some loot boxes do not provide duplicate or contextually worthless rewards that the player already possesses and therefore does not want, whilst other loot boxes do provide duplicate rewards meaning that players have potentially "wasted" their purchase (Ballou et al., 2020). These game design variations are worthy of further identification and classification using ludology/game studies perspectives that should also consider how specific loot boxes are implemented, and engaged with by players, in specific games (see Aarseth, 2019), rather than study the phenomenon as a singular whole, as has hitherto been done by the academic literature generally (cf. Perreault, 2021). However, in colloquial speech, "loot boxes" tend to be an all-encompassing term that is inclusive of all implementations of randomized monetization methods, regardless of their visual representation and design-related intricacies (Xiao et al., 2021c).

## Technical Definition

"Paid loot boxes" are not the only kind of randomized mechanics in video games, and thus the technical definition of "loot boxes" differs from that used in everyday speech. Besides sharing the commonality of *randomly* determining what rewards the player that engaged with the mechanic will receive, different implementations of loot boxes might differ structurally in two ways, as identified by Nielsen and Grabarczyk (2019). Firstly, how the player triggers the "eligibility condition" that activates the mechanic (specifically, whether the player must purchase the loot box using real-world money (fiat currency)). Secondly, whether the "rewards" that the player receives from the loot box have real-world monetary value. Either might be "isolated" to only the in-game economy or be "embedded" within the wider real-world economy.

In relation to satisfying the "eligibility condition," some loot boxes can be engaged with, or "opened," after the player defeats an enemy or performs some other in-game tasks that are "isolated" to be only relevant to the in-game economy. In contrast, other loot boxes require that players spend real-world money to purchase the opportunity to open the loot box through an in-game "microtransaction," which represents an action that affects and is "embedded" within the real-world economy.

In relation to the "rewards," some are "isolated" and can only be used within the game's internal economy (e.g., to cosmetically change the player's weapon color or alternatively to unlock a new weapon and more significantly alter the gameplay experience by potentially providing a competitive advantage (see Zendle et al., 2019a)) and cannot be transferred to other players. In contrast, other rewards can be transferred to other players and therefore bought and sold between players in exchange for fiat currency on a secondary market, thereby giving these latter rewards real-world monetary value (Drummond et al., 2020b) and causing them to become "embedded" within the real-world economy.

The four possible categories of loot boxes are summarized in Table 1. Notably, in some video games, e.g., *FIFA 2019* (Electronic Arts, 2018), the developer provides players with the technical facilities to transfer in-game items to each other but explicitly forbids the involvement of real-world money in such transactions (Xiao, 2020b). However, players are nonetheless able to contravene the games' rules and transfer in-game items in exchange for fiat currency: a process that has been referred to as "cashing out" (Yin-Poole, 2017). Such "transgressive play" (see Aarseth, 2007; see also separate entry

on [Transgressive Play](#)), or playing the video game in a way that is contrary to or incompatible with the designers' intentions for how the player should experience the game, means that, although some developers intended to implement loot box "rewards" that are "isolated" to the in-game economy, in practice such "rewards" are "embedded" within the real-world economy.

Category	Costs real-world money to engage? (Is the "eligibility condition" "embedded?")	Provides rewards possessing real-world monetary value? (Are the "rewards" "embedded?")	Example implementations in video games	Regulatory position in selected jurisdictions
Embedded-Embedded	Yes.	Yes.	Booster packs in <i>Magic: The Gathering Online</i> (Wizards of the Coast, 2002); FIFA Ultimate Team packs in <i>FIFA 2019</i> (Electronic Arts, 2018) [in practice through transgressive play].	Deemed as gambling in Belgium (Belgische Kansspelcommissie [Belgian Gaming Commission], 2018), the UK (UK Gambling Commission, 2017) and many other countries. Prior to March 9, 2022, incorrectly deemed as gambling in the Netherlands (Electronic Arts Inc & Electronic Arts Swiss Sàrl v Kansspelautoriteit, 2020; Kansspelautoriteit [The Netherlands Gambling Authority], 2018); since confirmed generally not to contravene Dutch gambling law (Afdeling Bestuursrechtspraak Raad van State [Administrative Jurisdiction Division of the Council of State (The Netherlands)], 2022).
Embedded-Isolated	Yes.	No.	Booster packs in <i>Magic: The Gathering Arena</i> (Wizards of the Coast, 2019); FIFA Ultimate Team packs in <i>FIFA 2019</i> (Electronic Arts, 2018) [as intended by the developer]; Card packs in <i>Hearthstone</i> (Blizzard Entertainment, 2014)	Deemed as gambling in Belgium (Belgische Kansspelcommissie [Belgian Gaming Commission], 2018). Unregulated in most other countries.
Isolated-Embedded	No.	Yes.	Loot drop system in <i>Path of Exile</i> (Grinding Gear Games, 2013) [in practice through transgressive play].	Unregulated in most countries.
Isolated-Isolated	No.	No.	Loot drop system in <i>Path of Exile</i> (Grinding Gear Games, 2013) [as intended by the developer]; Gachapon machines dispensing costumes for the player avatar in <i>Yoshi's Crafted World</i> (Good-Feel, 2019).	Unregulated in most countries.

Table 1. Nielsen and Grabarczyk (2019)'s loot box categorization framework (adapted from Xiao (2020b) and Xiao et al. (2021c)).

"Embedded-Embedded" type loot boxes require the player to purchase them using real-world money and provide rewards that can subsequently be cashed out (e.g., booster packs implemented in *Magic: The Gathering Online* (Wizards of the Coast, 2002)), whilst "Embedded-Isolated" type loot boxes also require paying real-world money to engage but do not

provide rewards that can be cashed out (e.g., booster packs implemented in *Magic: The Gathering Arena* (Wizards of the Coast, 2019)). Hereinafter, the focus of this encyclopedia entry is on these two types of loot boxes (which are collectively referred to as *paid* loot boxes) because these can be differentiated from randomized mechanics in video games in general due to the player being required to make additional real-world financial investments to engage with them. Indeed, policymakers and the academic literature have focused almost exclusively on paid loot boxes. Notwithstanding, further research should be conducted on non-paid loot boxes and randomized mechanics in video games in general, in addition to other forms of in-game monetization (see Petrovskaya & Zendle, 2021), to better understand how players engage with them and how that experience might differ from those relating to paid loot boxes.

## Paid Loot Boxes and Gambling

Paid loot boxes are presently frequently implemented in video games, particularly on mobile phone platforms: amongst the highest-grossing video games, 59% on the Apple iPhone platform contained paid loot boxes in the UK, as did 36% on the PC Steam platform (Zendle et al., 2020a). The prevalence rate differs across countries: 91% of the highest-grossing iPhone games contained paid loot boxes in China (Xiao et al., 2021d), suggesting that the loot box situation might be different across countries and cultures, of which future research should be conscious. Loot boxes are also readily available for purchase by children: 95% of the highest-grossing iPhone games containing paid loot boxes were deemed suitable for children aged 12+ (Zendle et al., 2020a).

Some researchers have argued that purchasing loot boxes is psychologically similar to gambling because both involve paying real-world money to "bet" on randomized results (Drummond & Sauer, 2018; Xiao, 2020a). In relation to purchasing loot boxes that provide rewards possessing real-world monetary value (i.e., the Embedded-Embedded type specifically), chance determines whether the player makes a direct monetary gain or loss (Drummond et al., 2020b). Indeed, physiological similarities between opening loot boxes and participating in certain gambling activities have been identified (Larche et al., 2021).

Further, loot box purchasing has been found to be positively correlated with problem gambling severity, meaning that, on average, a player with more problem gambling issues spends more money on loot boxes (Zendle & Cairns, 2018). This relationship has been replicated in more than a dozen studies using samples consisting largely of Western video game players (Garea et al., 2021; Spicer et al., 2021), e.g., in Denmark (Kristiansen & Severin, 2019), Germany (von Meduna et al., 2020), Spain (González-Cabrera et al., 2021), Australia (Rockloff et al., 2021), and the US (Zendle & Cairns, 2019), amongst adult and adolescent samples (Wardle & Zendle, 2021; Zendle et al., 2019b). Similar to gambling domains (Deng et al., 2021; Muggleton et al., 2021), loot box spending is not correlated with income, which is why video game companies appear to be disproportionately profiting from potentially vulnerable consumers (e.g., those with higher problem gambling severity; Close et al., 2021; Zendle et al., 2020b). Cross-cultural studies have suggested that this positive correlation might be weaker (Drummond et al., 2020a), and potentially even clinically non-significant, in certain countries, e.g., China (Xiao et al., 2021a). Further scrutiny of this relationship in non-Western countries will provide more diverse perspectives and help to inform appropriate national regulatory responses.

Importantly, the correlation between loot box purchasing and problem gambling severity by itself does not prove that paid loot boxes are harmful: it is not yet known whether purchasing loot boxes causes players to become problem gamblers or whether preexisting problem gamblers simply spend more money on loot boxes. Loot box purchasing has also been linked to "problematic" video gaming engagement in some studies (e.g., Li et al., 2019) but not in others (Spicer et al., 2021) (*n.b.*, there is debate as to whether one can be 'addicted' to video gaming at all (see Aarseth et al., 2016; cf. Király & Demetrovics, 2017)). There is also conflicting evidence as to whether purchasing loot boxes is correlated with worse mental wellbeing (Drummond et al., 2020a; cf. Etchells et al., 2022). The potential harms of paid loot boxes (if any) are not yet well understood and require further scrutiny.

## Regulation and Harm Minimization

Notwithstanding the lack of conclusive evidence of loot box-related harms, many countries have considered whether or not to regulate loot boxes as gambling or through other means (see Xiao, 2021b). Indeed, certain countries have already adopted regulatory positions that restrict the sale of loot boxes. For example, *all* paid loot boxes legally constitute gambling in Belgium and therefore have been effectively 'banned' from being implemented by companies without a gambling license (Belgische Kansspelcommissie [Belgian Gaming Commission], 2018). Companies seeking to comply with Belgian law have removed paid loot boxes from the Belgian version of certain games (e.g., 2K Games, 2018) or removed entire games from the Belgian market likely due to commercial unviability (e.g., Nintendo, 2019). In contrast, only Embedded-Embedded type loot boxes were previously considered to legally constitute gambling under Dutch and English law. (The Dutch law position has since been corrected on March 9, 2022, and Embedded-Embedded type loot boxes are presently also no longer considered to legally constitute gambling under Dutch law (Afdeling Bestuursrechtspraak Raad van State [Administrative Jurisdiction Division of the Council of State (The Netherlands)], 2022).) This highlights that there are differences between a common-sense understanding of what "gambling" is and the concept of "gambling" as defined by law, which itself also differs across jurisdictions. Even among countries with similar and seemingly practically identical gambling laws, the regulatory responses have diverged: the Netherlands' gambling regulator has previously sanctioned Electronic Arts for its implementation of Embedded-Embedded type loot boxes in *FIFA 2019* (Electronic Arts, 2018) without a gambling license (see *Electronic Arts Inc & Electronic Arts Swiss Sàrl v Kansspelautoriteit*, 2020; Kansspelautoriteit [The Netherlands Gambling Authority], 2020; this was later found to have been incorrect and unlawful after a successful appeal by Electronic Arts (Afdeling Bestuursrechtspraak Raad van State [Administrative Jurisdiction Division of the Council of State (The Netherlands)], 2022)), whilst, in contrast, the English gambling regulator has not enforced the law despite previously publicly recognizing Embedded-Embedded type loot boxes as constituting gambling under existing law and therefore illegal if sold without a gambling license (UK Gambling Commission, 2017). The prominent examples of national regulatory positions are summarized in Table 1.

Removing paid loot boxes as a product from the market is only one potential approach. Other methods of harm minimization focused on changing how loot boxes are designed have also been suggested and adopted by some video game companies (King & Delfabbro, 2019b; Xiao & Henderson, 2021): for example, implementing a monthly maximum spending limit to ensure that players cannot spend "too much" money (Drummond et al., 2019; cf King & Delfabbro, 2019a). China requires by law that companies selling loot boxes must disclose the probabilities of obtaining various potential rewards, thus providing a degree of transparency and fairness, although many companies failed to make prominent and easily accessible disclosures (Xiao et al., 2021d). The video game industry has also recognized consumer concerns with paid loot boxes and generally adopted probability disclosure as industry self-regulation to help consumers make "more informed" purchasing decisions (Entertainment Software Association (ESA), 2019; Xiao et al., 2021b). However, the effectiveness of such design-based measures at reducing player spending and potential harms has not been empirically assessed.

## Summary

Paid loot boxes are in-game products that players can purchase with real-world money to obtain randomized rewards of varying value. These mechanics bear conceptual similarities with gambling and have been the subject of intense regulatory scrutiny and academic research. Although there is emerging evidence of the psychological similarities between paid loot boxes and gambling and of potential harms (particularly financial harm being caused to vulnerable consumers, e.g., players with problem gambling issues), further research is required to fully assess and comprehend the nature and the extent of any negative consequence of loot box purchasing by players. This remains a rapidly developing research area with many unanswered questions that deserve attention.

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